

## C l a i m s

1. A valve device for preventing unintentional fluid outflow from a drinking container (32), the device being underpressure-activated and, when in position of use, being connected to an outflow opening in the container (32), c h a r a c t e r i z e d i n that the device consists of two flexible pressure-sensitive membranes (2, 4) constituting an outer membrane (2) and an inner membrane (4), respectively, that are placed at an axial distance from one another, and their peripheral attachment areas are pressure-sealingly interconnected, the constellation of which defines an intermediate reference pressure chamber (6), and that the chamber (6) is provided with at least one vent (8) placed outside of the activation surfaces of the membranes (2, 4) and in communication with an ambient pressure  $P_1$ , and that one of the two membranes (2, 4) is fixedly connected to a through-put flow pipe (10) for said fluid, and that the other of the two membranes (2, 4) is provided with a through-going membrane opening (12) within which the pipe (10) is movably arranged, and that the membrane opening (12) is associated with a primary sealing body (18) arranged to seal against fluid flow via the pipe (10), and with a secondary sealing body (16) arranged to provide a seal between the chamber (6) and an internal pressure  $P_3$  in the container (32), and that both sealing bodies (16, 18) are placed in pressure-sealing contact with the pipe (10) when the valve device is in an inactive position of rest, while at least the primary sealing body (18) is placed in an open position when the valve device is in an active position, the valve device

being activated by applying an underpressure P2 to the outside of the outer membrane (2) and moving it relative to the inner membrane (4).

2. A valve device according to claim 1,

5 characterized in that the flow pipe (10) is fixedly connected to the outer membrane (2), while the inner membrane (4) is provided with the membrane opening (12) for the pipe (10) and also associated with the primary sealing body (18) and the secondary sealing body  
10 (16).

3. A valve device according to claim 2,

characterized in that the primary sealing body (18) consists of a sealing plate that is placed on the inside of the inner membrane (4), and that is  
15 connected to the inner membrane (4) by means of at least one stay (20) by-passable to flow, the sealing plate (18) having a shape that causes pressure-sealing when bearing against the inwardly projecting, free end portion of the flow pipe (10).

20 4. A valve device according to claim 2 or 3,

characterized in that the secondary sealing body (16) is a flexible, ring-shaped sealing lip arranged about the membrane opening (12).

5. A valve device according to claim 2, 3 or 4,

25 characterized in that the primary sealing body (18) is provided with a perforation pin or point (54) in order to puncture a wall of the drinking container (32).

6. A valve device according to one of claims 2-5,  
c h a r a c t e r i z e d i n t h a t a p i p e l e n g t h s e c t i o n  
of the flow pipe (10) has a uniform outer diameter, the  
secondary sealing body (16) being placed pressure-  
5 sealingly against and moving along said pipe length  
section during activation of the valve device, whereby a  
permanent pressure seal exists between the reference  
pressure chamber (6) and the drinking container (32).
7. A valve device according to one of claims 2-5,  
10 c h a r a c t e r i z e d i n t h a t t h e f l o w p i p e (10)  
has a reduced outer diameter in at least the free end  
portion thereof, whereby a vent gap (22) is formed  
between the flow pipe (10) and the secondary sealing body  
(16) when the sealing body (16), upon activation of the  
15 valve device, is placed directly opposite a pipe length  
section having a reduced outer diameter, thereby allowing  
venting from the reference pressure chamber (6) to the  
drinking container (32).
8. A valve device according to claim 7,  
20 c h a r a c t e r i z e d i n t h a t t h e i n w a r d l y  
projecting free end portion of the flow pipe (10) is  
provided with a recessed area (14) having a uniformly  
reduced outer diameter.
9. A valve device according to claim 7,  
25 c h a r a c t e r i z e d i n t h a t t h e f l o w p i p e (10)  
has a conical shape, thereby having a progressively  
decreasing outer diameter towards the inwardly  
projecting, free end portion of the flow pipe (10).

10. A valve device according to claim 1,  
c h a r a c t e r i z e d i n that the flow pipe (10) is  
fixedly connected to the inner membrane (4), while the  
outer membrane (4) is provided with the membrane opening  
5 (12) for the pipe (10) and also associated with the  
primary sealing body (18) and the secondary sealing body  
(16).

11. A valve device according to claim 10,  
c h a r a c t e r i z e d i n that the pipe wall of the  
10 flow pipe (10) is provided with at least one flow  
aperture (70) at the free, outer end thereof, while the  
flow pipe (10) itself is sealed at the same end, and that  
the outer membrane (2) is provided with a seal housing  
(72) within which the membrane opening (12) for the pipe  
15 (10) is placed, about which membrane opening (12) the  
seal housing (72) is provided with an outer, ring-shaped  
primary sealing lip (18) that, when in position of rest,  
is placed in a flexible, pressure-sealing manner against  
the pipe wall outside of said at least one flow aperture  
20 (70), and the seal housing (72) also is provided with an  
inner, ring-shaped secondary sealing lip (16) that, at  
all times, is placed pressure-sealingly against a pipe  
wall area having a uniform outer diameter within said at  
least one flow aperture (70), the outer primary sealing  
25 lip (18) being moved away from the flow pipe (10) and  
opening to fluid flow via the at least one flow aperture  
(70) upon activation of the valve device.

12. A valve device according to any one of the preceding  
claims, c h a r a c t e r i z e d i n that the device  
30 is formed within, formed as or in connection with a cap

(1, 58), a drinking spout (24) or as part of the cap (1, 58) or the drinking spout (24), the cap (1, 58) or the drinking spout (24) being connected to the drinking container when in position of use.

5 13. A valve device according to any one of the preceding claims, c h a r a c t e r i z e d i n that the device is provided with a protective cover (28).

10 14. A valve device according to claim 13, c h a r a c t e r i z e d i n that the protective cover (28) is provided with an internal cover pipe (29) that projects inwards toward the valve device and is in contact with the outer membrane (2) and keeping it in place for secure closing of the valve device during transport and storage.